

# Sound Lab<sup>TM</sup>

## Owner's Manual

**BLANK**  
*SOFTWARE*

SECOND EDITION  
June 1987

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*CHAPTER 1 :*

# Getting Started

## Introduction

Congratulations, and welcome to Sound Lab. Sound Lab is a powerful new integrated Sound Design program for the Apple Macintosh and ENSONIQ Mirage. Sound Lab greatly facilitates the process of sampling and shaping sounds on the Mirage with the ease and elegance you would expect from a Macintosh application.

With Sound Lab you can view and edit waveforms, loop points, data values, and parameters with customized interactive graphic controls and displays. You can perform sound data manipulation and modification with MASOS and other sophisticated sound processing commands. You can also store libraries of Mirage sounds on standard Macintosh disks or hard disk systems.

## About the Manual

To use this manual you need to be familiar with both the Mirage and the Macintosh. It is assumed you have a grasp of their particular terminologies and operating techniques. If you have any doubt about what wavesamples or windows are, what select or loop mean, how to drag and click with the mouse, and so forth, go back and read the owners' guide for each machine. It is also assumed you are familiar with the topics and techniques covered in the *Mirage Advanced Samplers Guide*.

To accommodate different levels of expertise and familiarity with the Mirage and Macintosh, the manual is broken down as follows:

- "Getting Started" covers preliminaries about what you need and how to begin.
- "A Quick Tour of Sound Lab" gives you a quick run through the lab, introducing most of Sound Lab's windows, features, and functions.
- "Using Sound Lab" provides operational descriptions for most typical Sound Lab procedures and applications.
- "Sound Lab Reference" presents in greater detail all Sound Lab windows, and menu commands.

## The Equipment you Need

### System Requirements:

- Mirage Digital sampling Keyboard or Digital Multi-Sampler
- Apple Macintosh with at least 512K of memory
- Macintosh MIDI interface and two MIDI cables
- Mirage Advanced Samplers Guide

### System Options:

- Ensoniq Input Sampling Filter Cartridge

### Mirage Requirements:

- MASOS-M (Mirage Advanced Sampling Operating System - Macintosh version) version 2.0 or higher. 2 MASOS - M disks are included in this Sound Lab package.

MASOS-M is a special version of the MASOS disk and must be used with Sound Lab. Other MASOS disks will *not* work with Sound Lab.

## **Backup Disks**

For your convenience, the Sound Lab Program Disk provided has not been copy protected. It is strongly recommended that you make a personal back up copy of Sound Lab immediately, either from the Finder or by using any diskcopy program.

Also provided in the Sound Lab package are two copies of the MASOS-M disk. One of these disks should be reserved as a backup copy and should be stored with the Program master disk in a safe place. Should your primary disk become damaged or fail to operate properly, please send the defective disk to:

Blank Software  
Customer Service Dept.  
1034 Natoma Street  
San Francisco, CA 94103

Please include the registration number of your Sound Lab package. The disk will be replaced and returned to you as quickly as possible. Be sure to include your return address and your Sound Lab registration number.

## **Updates**

We at Blank Software realize your purchase of Sound Lab may represent a major investment in music software. We intend to take good care of you. Your purchase of Sound Lab entitles you to free software updates, and customer support for a period of six months.

To take advantage of this offer and to be eligible for support services, you must *fill out and return the enclosed prepaid registration card*. We are able to provide service and support only to registered product owners.

*CHAPTER 2:*

# A Quick Tour Of Sound Lab

## Introduction

In this section you will be introduced to most of Sound Lab's windows, features and functions. The tour proceeds sequentially making it inappropriate to skip around, however, you are encouraged to experiment with the various features as you move through the tour. The essential procedures in this tour are preceded by a bullet (□) allowing eager users to zip right through.

The screen graphics in the tour are provided as a visual reference only and may differ in content from your Sound Lab screens as you proceed through the tour.

## Setting Up

This introductory procedure starts with the assumption that you are using a Macintosh with at least 512K of memory and a MIDI interface properly connected to the Mac's modem port (the connector on the back of the Macintosh with the telephone icon).

Please make a back-up of the Sound Lab system disk provided in the Sound Lab package before using it, and store the original in a safe place (cool, dry, and away from magnetic fields). This protects you against accidental loss of your Sound Lab system master disk. The Sound Lab system disk is unprotected allowing you to make personal back-up copies easily from the Macintosh desktop or by using a disk-copy utility.

- Start with the power turned off on both the Macintosh and the Mirage.
- Using good quality MIDI cables, connect the MIDI OUT of the Macintosh MIDI interface to the MIDI IN of the Mirage, and the MIDI THRU/OUT of the Mirage to the MIDI IN of the Macintosh MIDI interface.
- Turn on the Mirage and insert the MASOS-M disk provided with the Sound Lab package into the Mirage disk drive. Wait for the MASOS-M disk to be completely loaded.
- Turn on the Macintosh and insert the Sound Lab system disk into the Mac's internal drive.

The Sound Lab disk icon appears on the desktop. It's highlighted to show that it's selected and ready for the next action.

- Choose Open from the file menu (or double-click the Sound Lab icon) to open the Sound Lab disk icon.

In the Sound Lab disk window you see the Sound Lab application icon as well as other document icons.

- Double-click the Sound Lab application icon to boot the program.

If all is well, the Sound Lab title screen will appear followed by the main Sound Lab editing windows. If there are problems, a dialog box will appear explaining the problem and offering a possible solution.

The Macintosh is now "on-line" with the Mirage. Browse through each of the Sound Lab menus to get a feeling for the possibilities present within the Sound Lab environment.

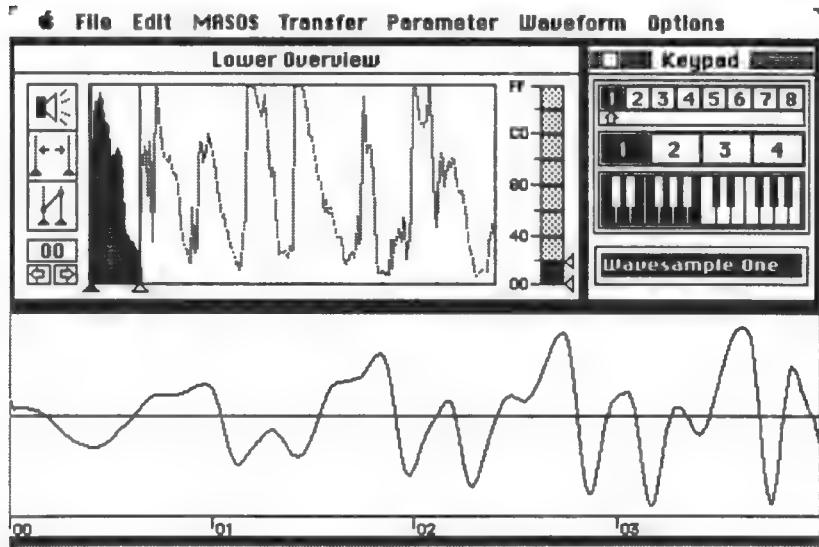
## The Main Waveform Windows

After the initial boot up, Sound Lab surfaces with three main windows visible. These three windows form the nucleus of the Sound Lab visual editing environment. They are the Overview window, the Keypad window, and the Waveform Series display. The windows should be blank at the moment because they don't have any waveform data to show off yet.

- Choose Mirage Disk ... from the File menu.
- Click button 3 followed by Load.

The Mirage Disk command is used to remote control Mirage sound disks access. The buttons one thru three represent the three sound bank on disk.

- Click Return to exit the Mirage Disk dialog.

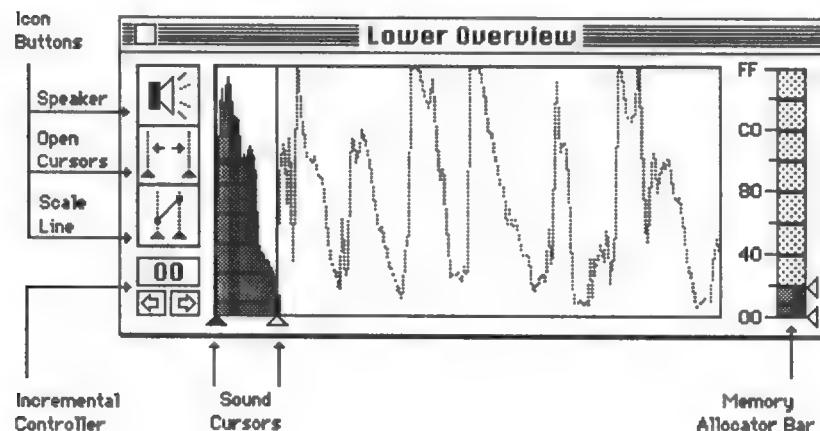


If you followed the boot up procedure outlined in "Getting Started", you should hear the numbers one thru eight while playing the Mirage keyboard. These default sounds will provide a good introduction to Sound Lab organization. However, first, you must transfer the data from the Mirage to the Macintosh.

- Choose Get Lower from the Transfer menu.

An indicator will appear showing transfer progress. Transferring an entire memory bank to and from the Macintosh amounts to about one million bits of wavesample information coming across MIDI one bit at a time (it should take under a minute).

When the transfer is completed, the Overview window shows you the entire contents of waveform memory for the currently selected keyboard half, displayed as a peak waveform envelope. If the keyboard half is multi-sampled, the region defining the current wavesample is highlighted in gray, while the rest of waveform memory shows a dotted white outline.



The left side of the Overview window contains a row of icons and indicators. Clicking inside the Speaker icon will cause the section of waveform memory currently selected to sound through the Macintosh's internal speaker or "line-out" jack.

- Click inside the Speaker icon located in the Overview window to hear the first wavesample.

Just below the Speaker are the Open Cursors and the Scale Line icons. For Operational details see the sections on "Using the Sound Cursors" and "Using the Scale Line Controller" in the Using section of this manual.

At the bottom of the left hand column, are a pair of arrows and a numeric display. Together these comprise the Incremental Controller. Clicking inside either arrow moves the highlighted (displayed as all black) Sound Cursor tab to the left or right one page at a time (a page being 256 samples in waveform memory). The numeric display gives a hexadecimal readout of the tab's current location in memory.

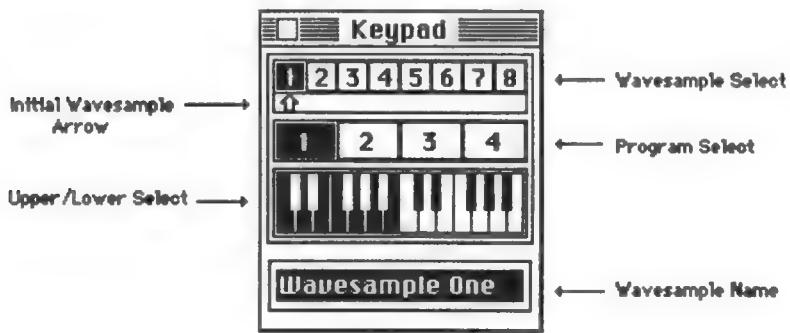
On the right side of the Overview window is the Memory Allocator bar. As a display, the Memory Allocator bar shows you how the current keyboard half (64K memory bank) in the Mirage is divided into individual wavesamples, and where they are located in memory. Clicking inside a section of the Memory Allocator bar is one way to change the current wavesample.

- Click inside any of the black & white dotted regions of the Memory Allocator bar (located on the right side of the Overview window).

After clicking inside a new memory region in the Memory Allocator bar, a new envelope section should also appear highlighted in gray.

- Click inside the Speaker icon to hear the newly selected wavesample.

Another way of selecting the current wavesample is by clicking inside any of the Wavesample Select buttons in the Keypad window. The Keypad window is located in the top right corner of the screen.



- Click inside any of the Wavesample Select buttons located in the Keypad Window.
- Click the Speaker to hear the wavesample.

The Keypad Window also shows you the Initial Wavesample, the current program number (one through four), the current keyboard half (Upper or Lower), and the current wavesample name. You can change any of the above settings by clicking inside the desired area.

Stretching across the bottom of the screen is the Waveform Series display. This versatile window allows you to view the waveform memory selected (in the Overview window) in a variety of user-definable resolutions and densities. The default resolution for the Waveform Series display is four pages. Other Waveform Series resolutions are two pages, eight pages, or Auto Size, which will automatically size whatever is selected between the two sound cursors to fill the entire display.

- Experiment with different resolutions for the Waveform Series display by choosing 1, page 2 pages, 4 pages, or 8 pages, from the Waveform menu.

The ruler-like marker which runs along the bottom of the window, displays the page numbers covering that section of memory.

A *page* in computer-ese refers to a collection of 256 bytes of data. In the case of Mirage sound data, this amounts to 256 individual waveform samples (FF H samples in hexadecimal notation). The concept of *Pages* in the Mirage is a very subtle but extremely important one. For more information refer to the *Mirage Advanced Samplers Guide* pages 17, 56-57).

- Choose Freeze Tracking from the Waveform menu.

The Freeze Tracking command locks the Waveform Series display to the current Sound Cursor settings. Subsequent movement of the Sound Cursors will not effect the Series window until the Unfreeze Tracking command is chosen. This allows you to move around quickly with the Sound Cursors without having to wait for the Waveform Series display to update each time.

## The Secondary Waveform Displays

Sound Lab has two other high-resolution windows available for specialized editing and display functions; they are the Page and Loop Splice windows. The Page window shows you a full resolution, sample by sample account of any single page in waveform memory.

- ❑ Choose Show Page from the Waveform menu.

At the bottom right of the Page window a scroll bar is provided allowing you to flip forward and backward thru memory a page at a time (the page number is inside the thumb button). Clicking and holding down in either scroll bar arrow creates a waveform animation effect. It can be very helpful to see your samples evolve in this manner, especially when looking for good loop points. Above the scroll bar are two numeric readouts which track the location of the mouse inside the page window. These readouts tell you the Sample number the mouse is currently on (going from left to right) and the Value (amount up and down) at that location.

- ❑ Flip through waveform memory of the current wave sample a page at a time by clicking and holding down inside the scroll bar arrows.

The four icon buttons along the bottom left of the Page window correspond to the four possible modes of operation: Draw, Rotate, Interpolate, and MASOS fine-tune.

In Draw mode, the pencil cursor can be used to edit an existing waveform by directly redrawing the waveform with the mouse. Totally new waveforms can also be created from scratch by drawing into waveform memory. The other three modes will be discussed later in the manual.

- ❑ Choose Hide Page from the Waveform menu.

Another extremely valuable waveform window is the Loop Splice window. A special sound file named "Loop Splice" has been included with your Sound Lab system disk to help illustrate Loop Splice. "Loop Splice" will be loaded into Upper memory to prevent writing over the voices currently in lower memory.

- ❑ Click Upper (inside the upper half of the Keyboard icon, located in the Keypad window, to switch to Upper memory).

- Open the "Loop Splice" Sound File.
- Click the OK button in response to the "request to send" waveform dialog.

Sound Files are opened like any standard Macintosh document. First select Open from the File menu, select the desired file, and click the Open button. A Sound File is the Sound Lab document for an entire Upper or Lower keyboard half (Mirage 64K memory bank plus parameters).

- Choose Show Loop Splice from the Waveform menu.

The Loop Splice Window is divided into two parts with the actual splice point (a single vertical line) running down the center of the window. On the right side of the splice point is the first half page of waveform memory after Loop Start. On the left are the last 128 samples in memory before loop end. As you can see in our loop example, this transition is not quite as smooth as it could be. Using the scroll bar in the Loop Splice window you can attempt to get the end point and the start point to line up creating a smooth transition.

- Hold down a key on the upper part of the Mirage Keyboard (rack-mount Mirage owners use the "e" key on the Macintosh keyboard with caps lock on) listening for the pop at the Loop Splice Point. While holding down the key, click and hold down inside the left arrow key of the scroll bar (decrementing the loop fine adjust) until you create a smooth loop transition and the pop disappears.
- Close the Loop Splice window.

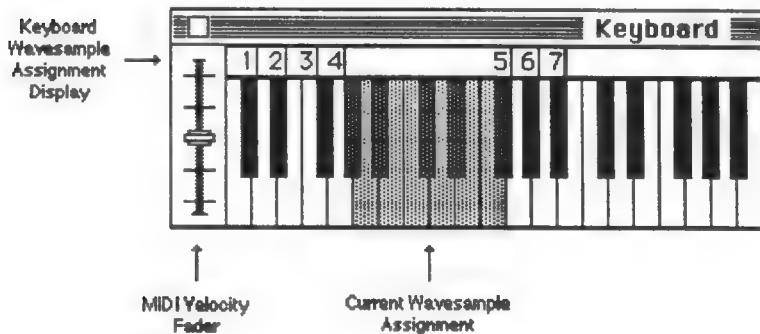
The Loop Splice window, like all windows in Sound Lab, can be closed in any of three ways. First you can choose the Hide command linked to the window in question (i.e., Hide Loop Splice in the Waveform menu), or you can click in the window's "goaway" box (located in the top left of each window), or lastly, if the window is the active window, you can choose the Close command from the File menu.

## The Parameter Windows

Of all the Mirage voicing features, perhaps the most confusing is the wavesample keyboard assignment process (assigning keyboard ranges for your multi-samples). Sound Lab's Keyboard window was designed to let you instantly see where your samples are located and how to change their keyboard assignment painlessly.

- Click inside the lower half of the Keyboard icon in the Keypad window.
- Choose Show Keyboard from the Parameter menu.
- Choose Hide Series from the Waveform menu.

The Top Key window appears with the assigned wavesample ranges marked across the top of the five octave keyboard display. The keys highlighted in light gray represent the zone of the current wavesample.



Play the Mirage Lower keyboard to verify that the zones marked in the Top Key window are correct.

- Place the mouse cursor over any of the dividing vertical lines in the wavesample assignment display area (above the keys in the Keyboard window). When the cursor changes to a bi-directional arrow, drag the divider to the left or right to resize the keyzone.

Play the Mirage to verify the changes.

- Make wavesample number four the current wavesample by clicking its wavesample select button in the Keypad window.

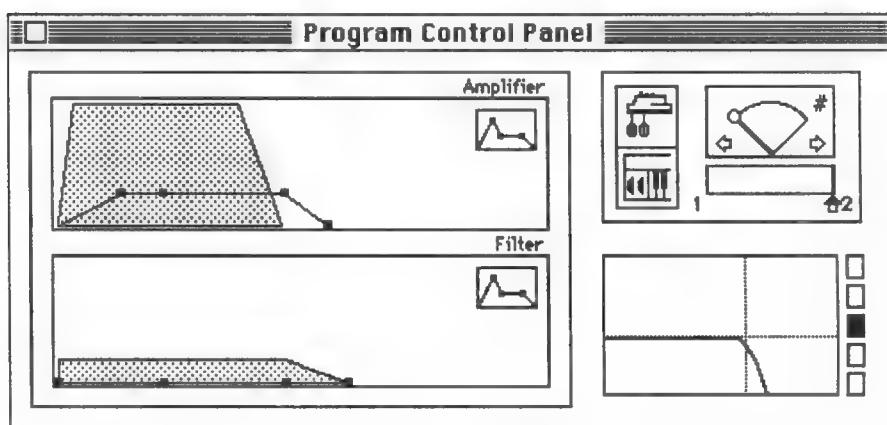
The settings for Initial Wavesample arrow in the Keypad window can also drastically affect keyboard assignment. Refer to page 12 of the *Advanced Samplers Guide* for details on initial wavesample and the Mirage keyboard wavesample assignment process.

- Drag the Initial Wavesample arrow (located under the Wavesample Select buttons in the Keypad window) so that it points directly at wavesample four. The Top Key window should update its display to accommodate the new Initial Wavesample setting.

Most of the Sound Lab voicing controls are located in the Program window. The Program window is a panel of interactive controls, indicators, and switches. The panel has been specially designed to give you a quick graphic readout of all the Mirage parameters relating to program voicing (with the exception of LFO, Mono Mode, and Initial Wavesample).

Although it is beyond the scope of this guided tour to give operational instructions for each control, descriptions can be found in the reference section of this manual.

- Click Upper (Keyboard icon in the Keypad window).
- Choose Show Program from the Parameters menu.



- Click the different Program Select buttons in the Keypad window. The Program Control Panel should change to reflect your choices.

At the left side of the Program window are the Amplifier and Filter Envelope controllers. Both envelopes appear as line segment graphs connected by black rectangular tabs. Each envelope has a superimposed shaded region which represents the envelope shape with maximum velocity modulation applied.

On the bottom right of the Program window is the Filter control. Here you can see and adjust the filter's frequency and resonance simultaneously by dragging at the filter's cutoff point (the point at which the two dotted lines within the control intersect). The five little boxes stacked to the right of the filter control show Keyboard Filter Tracking amount.

- Position the mouse inside the Filter controller and drag the cutoff point in any direction. Release the mouse and play the **Mirage Lower** keyboard to verify the changes.

The group of controls in the top right are responsible for dealing with the two digital oscillators present within each **Mirage** voice. There are icons for Mix Mode and Velocity, an Oscillator Mixer, and a detune controller.

For those who want exact numeric references to the for the voicing controls in Sound Lab, a special window called Numerics is available for that purpose.

- Choose Show Numerics from the Parameter menu.

Numeric Display								
Pointers	1	2	3	4	5	6	7	8
Sample Start	00	20	40	60	80	A0	C0	E0
Sample End	1F	3F	5F	7F	9F	BF	DF	FF
Loop Start	1E	3E	5E	7E	9E	BE	DE	FE
Loop End	1E	3E	5E	7E	9E	BE	DE	FE
Loop Fine	FF							
Loop Switch	00	00	00	00	00	00	00	00
Relatives	1	2	3	4	5	6	7	8
Coarse Tune	04	04	04	04	04	04	04	04
Fine Tune	80	80	80	80	80	80	80	80
Amplitude	63	63	63	63	63	63	63	63
Filter	30	30	30	30	30	30	30	30
Max Filter	99	95	95	95	95	95	95	95
Top Key	04	08	12	15	11	11	11	11
Amplitude	1	2	3	4	5	6	7	8
Attack	00	00	00	00	00	00	00	00
Peak	10	10	10	10	10	10	10	10
Decay	15	15	15	15	15	15	15	15
Sustain	10	10	10	10	10	10	10	10
Release	10	10	10	10	10	10	10	10
Filter	1	2	3	4	5	6	7	8
Attack	00	00	00	00	00	00	00	00
Peak	00	00	00	00	00	00	00	00
Decay	15	15	15	15	15	15	15	15
Sustain	00	00	00	00	00	00	00	00
Release	31	31	31	31	31	31	31	31
Osc / Filt	1	2	3	4	5	6	7	8
Init Sample	0	0	0	0	0	0	0	0
Mix Mode	0	0	0	0	0	0	0	0
Mono Mode	0	0	0	0	0	0	0	0
LFO Freq	1	1	1	1	1	1	1	1
LFO Depth	0	0	0	0	0	0	0	0

The Numeric Display window is a comprehensive read-only display of all the wavesample and program parameters contained in the current keyboard half.

Choose Quit from the File Menu.

This concludes the Sound Lab guided tour. You should now have a basic familiarity with the system; further exploration, experimentation, and investigation are all that stand between you and advanced sampling success. For more complete descriptions of the Sound Lab menus and windows refer to the Using and Reference sections of this manual.

***CHAPTER 3:***

# Using Sound Lab

## Using the Sound Cursors

### 1. Setup Sound Lab with a favorite sample from your sound library.

To set up Sound Lab either load a sound on the Mirage and transfer it to the Macintosh using the Get Upper/Get Lower command or Open a Sound File from the Macintosh and use the Send Upper/Send Lower command to get it over to the Mirage.

The sample you choose should be as long as possible (preferably an entire keyboard half) to give you lots of room to move the cursors around. A dynamic sample with lots of isolated events (like an orchestra hit or speech) is ideal.

### 2. Click the Speaker icon to hear the sample.

The Sound Cursors default to select the entire range of the current wavesample. Clicking inside the Speaker icon plays the segment of the current wavesample selected out the Macintosh's internal speaker or "line out" jack.

If you're fond of keyboard equivalents, 'command space bar' (press space bar while holding down the command key) is the keyboard equivalent for the Speaker icon.

### 3. Select a section of waveform memory using the Sound Cursor markers.

The word "select" here refers to the waveform data which lies between the Sound Cursor markers. To select memory within the current wavesample, drag the Sound Cursor Start marker by its triangular tab located along the bottom of the Overview display to what looks like an interesting place in memory (the gray envelope contour in the Overview window should tell you about where you are in memory).

After releasing the tab, click the Speaker to hear where you are in memory. Repeating this process with both Sound Cursors you can quickly isolate the sound segment you wish to edit, process, or display.

The Sound Cursors may also be dragged as a group, operating like a sliding glass door into wavesample memory. You can experiment with this by pointing the mouse somewhere between the two Sound Cursor markers. The arrow should change to a "Hand" cursor indicating you can now drag them together as a group. The Hand cursor will not appear, however, when the Sound Cursors are either too close together, or when they are fully opened to the wavesample boundaries.

**4. Choose Reverse from the MASOS menu.**

**5. Click the Speaker to hear the change on the Macintosh.**

You should now hear your selection reversed. It's that easy. Nearly all the Sound Lab editing and processing functions follow this procedure.

- First select the desired memory segment using the Sound Cursors.
- Choose the desired editing or processing command from the Edit or MASOS menus. (the Scale and Compress functions do also require the Scale Line controller. See the section on "Using the Scale Line controller" which follows).

**6. Click ON the Open Cursors icon (located just below the Speaker) and listen to the entire wavesample.**

Clicking ON the Open Cursors icon allows you to select the entire wavesample for monitoring purposes without losing your current Sound Cursor settings. Click the Speaker to hear the entire sample. Clicking the Open Cursors icon OFF will restore the Sound Cursors to their previous settings.

**7. Click OFF the Open Cursors icon. Choose Reverse again to restore the sound to normal.**

NOTE: Sometimes things can get a little crowded when Sound Cursor are real close together. Sound Lab provides special features for selecting and dragging the Sound Cursors in these crowded situations. Refer to "The Overview Window" in the reference section of this manual.

## Using the Scale Line Controller

- 1. Setup Sound Lab with a favorite sample from your sound library.**

See the section on "Using the Sound Cursors" for details on how to set up Sound Lab.

- 2. Select a sample segment with the Sound Cursors.**

- 3. Click the Scale Line icon in the Overview Window.**

Clicking inside the Scale Line icon (bottom icon in the series of three) displays the Scale Line controller at the top of the Sound Cursors. The controller looks like a barbell, with the Scale Line itself suspended by two rectangular tabs which travel vertically along the Sound Cursor Markers.

Clicking on the Scale Line icon also highlights the Scale and Compress commands in the MASOS menu.

- 4. Drag the Scale Line control about half way down the Sound Cursor Markers.**

The Scale Line can be set by either dragging each tab individually or together as a group. To drag as a group point the mouse at the Scale Line itself. When the cursor changes to a bi-directional (up/down) arrow, pressing and holding the mouse will drag the entire unit.

- 5. Choose Scale from the MASOS menu. Click the Speaker to hear the result.**

The sound segment selected should now be about half as loud as before, both inside the Macintosh and the Mirage.

The Scale Line controller can also be used to Compress rather than Scale a selected sample. With the compressor, the Scale line adjusts the compression threshold rather than the scale factor.

## The Sample Window and Short Loops

Sound Lab, with its automated sampling features greatly simplifies the process of getting a good short loop on the Mirage. The process outlined below will work for any instrument which is tunable, clearly pitched and stable (no wavering or vibrato). Synthesizers, guitars, or even your own beautiful voice should work just fine (provided you can match pitch without vibrato).

Short Loop are a special breed of animal in the Mirage, if you haven't done so recently, it might be helpful to re-read the section on "Short Loops" (pg. 57) in the Advanced Samplers Guide.

### **1. Open the "Vanilla Lower" template stored on the Sound Lab system disk.**

"Vanilla Lower" is a sampling template similar to the "Lower 1" sound (two samples per half) on your MASOS-M disk.

### **2. Choose Loop Switch from the Options menu.**

Loop switch will setup a single page loop beginning one page before the end of the wavesample (7E Hex). You should also notice the Loop arrows appear at their appropriate location in the Overview window.

### **3. Choose Sample from the Parameter menu.**

The Sample configuration has been setup with Multi-sampling and line level selected, however, if you are using a microphone or have the External Input Sampling Filter connected, you will need to change the configuration settings to match your system setup.

A Sample rate of 28571 Hertz was chosen for sampling the note 'A' an octave and a third below middle 'C'. If you want to sample a different note, adjust the sample rate with the scroll bar provided until the desired note appears in the note display. The input filter, tuning tone, frequency display and sample time will all be set automatically to accommodate the sample rate you select.

### **4. Click ON the Tone button in the Sample Configuration window. Tune your instrument to match the tone coming out the Macintosh. When finished click the Tone button OFF.**

This tuning tone has been calculated by Sound Lab to aid you in Sampling at perfect looping frequencies, eliminating the normal trial and error process. Be sure to tune as precisely as possible. Tuning an octave too high or low will yield undesirable results (to sample at higher frequencies see Loop Harmonic in the reference section).

**5. Sample your instrument into the Mirage's Lower memory bank.**

Follow the normal procedure for sampling on the Mirage. If you followed the above directions. The sampled instrument should now play back with a perfectly tuned loop.

## Long Loops with the Xfade Loop Command

The Sound Lab cross-fade loop algorithm works on the theory that since a sample will always make a seamless transition from before the loop start into the loop body, if we could just merge that same sound data from before loop start with the loop end everything would sound just beautiful.

Perhaps an example would help clarify the situation.

### 1. Open the "Xfade Loop" demo on the Sound Lab data disk.

The sample is a good long loop candidate due to its characteristic slow undulating harmonic shift throughout the prime looping area.

### 2. Choose Send Lower from the Transfer menu.

You may want to preview the demo sample on the Mirage or with the speaker icon. The demo Sound File is actually a voice sample added to a strong analog synthesizer filter sweep sample.

### 3. Choose Loop Switch from the Options menu.

The loop start and end markers appear at locations 88 H and FE H in the Overview window.

The locations of the loop markers have been set using the long loop guidelines set forth on pages 55-56 in the *Mirage Advanced Samplers Guide*.

### 4. Play the Mirage to monitor the loop splice pop.

The audible click at the loop splice point is due to booth waveform discontinuity as well as harmonic shift. The cross-fade loop algorithm will attack them both.

### 5. Choose Xfade Loop ... from the MASOS menu.

Sound Lab presents the Cross-fade loop dialog. The default settings will work fine for our example as well as most cross-fade loop applications. For more information on the Cross-fade loop options refer to the Reference section of this Manual.

### 6. Click OK to begin the cross-fade.

Sound Lab will now look to see if your loop start page is lined-up on a zero-crossing of the waveform. This subtle detail can make a big difference on the Mirage.

**7. Click OK in response to the request to rotate dialog.**

The cross-fade now begins its behind the scene execution. A percentage of the loop body, as indicated in the cross-fade loop dialog, is faded out just prior to the loop end marker. An equivalent amount of sample data immediately preceding the loop start marker is then copied to a buffer and faded *in*. Finally, the sound data from the buffer is then added to the end of the loop completing the cross-fade.

**8. Click OK in response to the request to transfer dialog.**

Sound Lab updates the Mirage sound data effected by the cross-fade.

**9. Preview the new loop.**

You now have a powerful long loop utility at your disposal. You will be amazed how often this technique is successful if care is taken while sampling and when placing the loop markers.

## **Creating a Wavedata Library**

### **1. Choose New From the File Menu.**

The New command resets the program and wavesample parameters to Sound Lab defaults and clears all wavedata memory for the current keyboard half in both the Macintosh and Mirage.

### **2. Open the "Low Drums" Template file.**

To open the "Low Drums" Template, choose Open from the File menu. The new Open dialog box appears with the three file types: Sound File, Template and Wavedata. The Sound File is selected as the default type. To Open a different file type, click inside the button to the left of the desired type. The Open dialog will disappear briefly, returning with a list of the requested files.

Open the "Low Drums" Template by clicking the Open button, or double clicking over the file name. The Template information stored on disk will be loaded into the keyboard half from which it was saved. The Template information is then automatically transferred to the Mirage.

### **3. Open the "Bass Drum 1" Wavedata file**

To Open a Wavedata file you must select type Wavedata in the Open dialog. After opening the file, click OK in response to the "request to send to Mirage" dialog. Click inside the Speaker icon to verify the Wavedata in the Macintosh.

### **4. Choose Show Keyboard from Parameter menu.**

The Keyboard window appears with a new wavesample assignment scheme, and a slider on the left side for adjusting the velocity during remote-play of the Mirage.

### **5. Click inside either of the two shaded keys in the Keyboard window.**

You should now hear the Bass Drum Wavesample you just loaded in playing out the Mirage. You can now remote-play the Mirage directly from the Keyboard window by clicking inside the desired key. The Mirage is sent a MIDI "note on" corresponding the note selected. A MIDI "note on velocity" value corresponding the level of Keyboard Velocity Slider is sent as well to allow monitoring of different velocities.

**6. Type the "Z" and "S" keys on the Macintosh keyboard.**

You should now hear the same Bass Drum sound as before. The Macintosh keyboard is another way of remote-playing the Mirage. See the section on Remote-play of the Mirage Digital Multi-Sampler for the keyboard layout.

**7. Select Wavesample 2 in the Keypad window. Open the "Snare Drum 1" Wavedata file. Transfer to the Mirage.**

**8. Continue the same procedure for Wavesamples 3 thru 7 loading in the Wavedata files: "Snare Drum 2", "Snare Drum 3", "Synth Tom", "Hi-hat 1", and "Hi-hat 2".**

**9. Choose Show Relatives from the Parameter window.**

The Relatives window gives you a graphic representation of the relative amplitudes and filter frequencies for all eight Wavesamples. Experiment with different volume mixes by dragging the faders in the relative amplitude mixer. Play the appropriate Wavesample to verify the result. When you are satisfied with the mix across the keyboard, close the Relatives window.

**10. Choose Tuning... from the Parameter window.**

From the Tuning dialog you can fine tune the individual drums using the octave and fine tune scroll bars. With the buttons along the bottom of the dialog you can select the Wavesample you wish to tune. If you own a rack-mount mirage, you can use the Macintosh keyboard to monitor the wavesamples as you adjust their relative tunings. When you are satisfied with the tunings click inside the OK button to return.

**11. Click inside the text edit box located near the bottom the the Keypad window and type in a new name for your sample. Repeat for all seven Wavesamples.**

Congratulations! You have just create a new Sound File using the wavedata library. You can now save the complete Sound File on the a Macintosh disk using the Save or Save As commands in the File menu.

To save a copy on the Mirage, Insert a formatted Mirage data disk into your Mirage. Choose "Mirage Disk" from the File menu. . Clicking inside the Save button will save the wavedata currently stored in the Mirage's memory (either Upper, Lower, or both) to the selected bank on the Mirage. For this example you can save the Lower bank only by clicking inside the box to the left of "Upper" in the Mirage Disk Dialog. The checkbox will toggle off and only the Lower Sound File will be stored.

## Waveforms in Three Dimensions

1. Open the "3-D Demo Sounds" Sound File on the Sound Lab data disk.
2. Click the Speaker Icon in the Overview window to hear the Sample.

The Wavesample "3-D ahhh ..." was sampled with an exaggerated pitch shift to demonstrate the visual effect of plotting a Wavesample with unstable frequency information.

3. Choose 2 Pages in the Waveform menu.

The Series window display attributes 1 page, 2 pages, 4 pages and 8 pages vary the number of pages plotted in each "plane" of the 3-D display.

4. Choose Show 3-D in the Waveform menu.

After choosing Show 3-D, Sound Lab begins to draw the wavedata selected between the two Sound Cursors (in this case the entire Wavesample) in a pseudo three-dimensional fashion. Groups of pages are drawn (1, 2, 4, or 8 page groups) from the end of the selected waved first, moving progressively toward the beginning.

Analyzing the wavedata in this manner gives you the advantage of seeing the progression of a periodic waveform over time. With the "3-D ahhh ..." sample, (looking from the front to the back) you can see the pitch go immediately flat, stabilize for a moment, and then bend dramatically sharp just before the end.

To monitor the sample out the Macintosh while the 3-D window is up, use the keyboard equivalent for the Speaker Icon ("clover" space bar).

To stop the plotting at any time hold down the "clover" key and type a period. After the plot is complete, clicking the mouse anywhere will close the 3-D window.

5. Choose 1 Page and Show 3-D in the Waveform menu.

Since this Wavesample is only approximately one cycle per page, a nice evolution of the waveform can be seen using the 1 Page option.

**6. Select Wavesample 2 to be the current Wavesample.**

It is also interesting (and entertaining) watch to the timbre evolution of the waveform over time. The 3-D waveform display serves this purpose well.

**7. Click the Speaker to Hear the Sample. Choose Reverse from the MASOS menu.**

It is often more informative to see the waveform displayed from the back to the front especially with plucked instrument type of timbers.

**8. Choose 1 Page and Show 3-D from the Waveform menu. Repeat for Wavesample 3.**

If you have an Imagewriter printer hooked up to your Macintosh, holding down the "clover key" and typing the number 4 key will give you a nice printout of the 3-D display. Experiment with some of your own Wavesamples and have fun!

*CHAPTER 4:*

# Sound Lab Reference

## Introduction

This reference section contains specific information about all of the commands, controls, and windows contained in Sound Lab. Although operational descriptions are given when appropriate, some operational descriptions can also be found in the Using section of this Manual.

Mirage parameter numbers are included throughout this section to provide a link with pre-existing Mirage documentation. References to the Mirage Advanced Samplers Guide are also given to enable further research.

## Sound Lab Menus

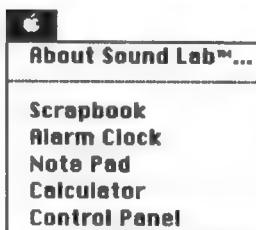
In addition to the standard Apple menu, Sound Lab has seven menus: File, Edit, MASOS, Transfer, Parameter, Waveform, and Options. The File and Edit menus contain the same standard commands for managing and editing data files found in most Macintosh applications plus some which are specific to Sound Lab.

Any command requiring or providing further information appears in the menu with an ellipsis (...) after it. When you choose these commands a dialog box appears with the appropriate information or options.

Command key equivalents of menu commands appear to the right of the menu item and are identified by the clover key symbol followed by the key to be pressed in conjunction with the clover key.

Commands or their options appear dimmed in the menu if they are inappropriate or inactive at the given moment. For example, the Undo command is dimmed if the last editing command executed cannot be undone.

### The Apple Menu



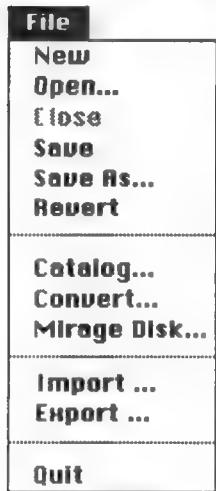
#### About Sound Lab™...

The About Sound Lab command opens a dialog box containing specialized information about the program, and the available space left on your disk.

#### Desk Accessories

Selecting any of the desk accessories causes that accessory to appear on the desktop as the active window. Refer to your Macintosh manual for details on desk accessories.

## The File Menu



Sound Lab works with three types of files: the Sound File, the Wavedata file, and the Template.

The Sound File contains an entire Upper or Lower memory bank of the Mirage. This includes all 64K of waveform data, Wavesample parameter definitions for all eight Wavesamples, Program parameter definitions for all four Programs, and global Configuration data. Sound Lab can hold two Sound Files in memory simultaneously, usually corresponding to the Upper and Lower banks in the Mirage.

The Wavedata file is all or part of the Sound File's waveform data, independent of any associated Wavesample, Program, and Configuration parameters.

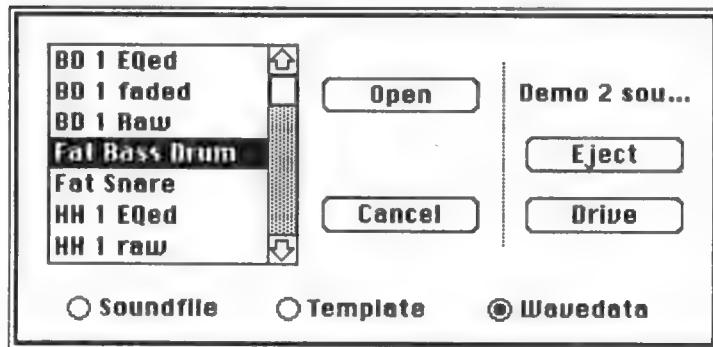
The Template file is all of the Wavesample, Program, and Configuration parameters of the Sound File, independent of any waveform data. Templates can be used as "Sampling Presets," customized to suit particular or re-occurring sampling needs.

### **New**

Resets all Mirage Parameters to the Sound Lab defaults and clears waveform memory.

### **Open**

Opens a Sound File, Template, or Wavedata file stored on disk. After you select the Open command, a dialog box appears presenting a list of files previously stored on the disk named in the dialog box. You can open a new file by first clicking on the desired file name and then on the Open button (or by double clicking over the file name).



The file type options are displayed along the bottom of the dialog box as three button selectors. Only selected file types are displayed. You can select a new file type by clicking inside the button to the left of the desired type. After you select a new file type, the dialog box temporarily disappears, then returns with a new list of files (if there are any) of the requested type. If the Wavedata file type is chosen, only the waveform data will be loaded into the region of memory defined by the two Sound Cursors. Any waveform data which stretches beyond the selected area will be truncated.

The Eject button ejects the disk currently named in the dialog box. If a new disk is inserted, Sound Lab will show you the name of the new disk in the dialog box and any files it contains. If you have a two drive system and both drives contain disks, the Drive button alternates between the drives, showing the Sound Files on each.

### **Close**

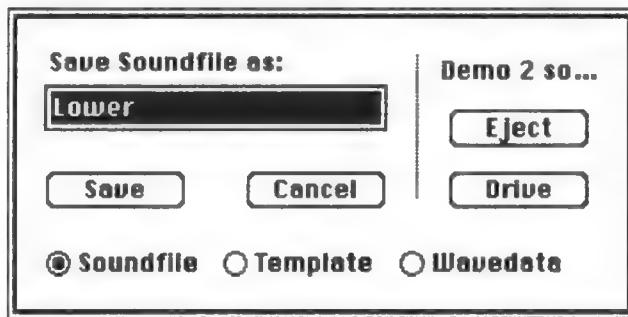
Closes the active window.

## Save

Saves the Sound File you're currently working on (all waveform and parameter data). Usually the Save command is used when you've changed waveform or parameter data and want to update the copy already stored on disk. If you want to save the updated Sound File on another disk or using another name see "The Save As Command" section below.

## Save As ...

Saves the Sound File, Template, or Wavedata file you're currently working on under the name you specify and to the disk named in the dialog box. Use the Save As command when you want to save a Sound File under a different name but want to keep the old version intact, or when you want to save a Sound File on another disk. The Save As command must also be used when you wish to save a Template or Wavedata file.



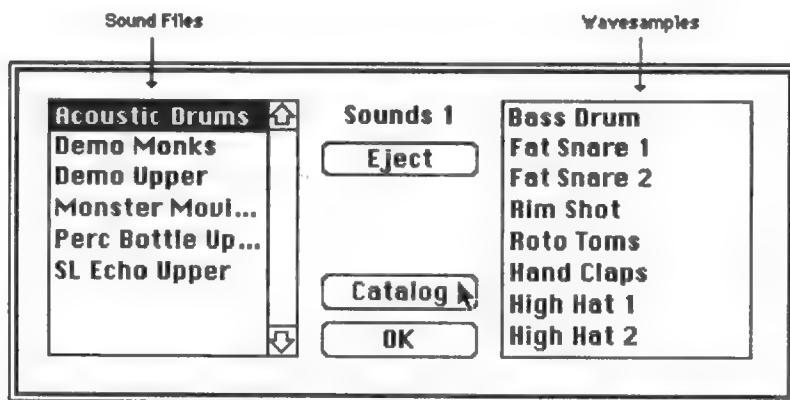
After selecting the Save As command, a dialog box appears with a place for you to type a name. After naming the file, save it on the disk named in the dialog box by clicking the Save button. If a file with that name already exists on the disk, Sound Lab asks you if you're sure you want to replace the existing one.

As in the Open dialog box the file type options are displayed along the bottom of the dialog box as three button selectors. If you choose the Wavedata file type, only the waveform data selected between the Sound Cursors in the Overview window will be saved.

The Eject button ejects the disk currently named in the dialog box. If a new disk is inserted, Sound Lab will show you the disk name in the dialog box. If you have a two drive system, and disks contained in both drives, the Drive button alternates between the two drives.

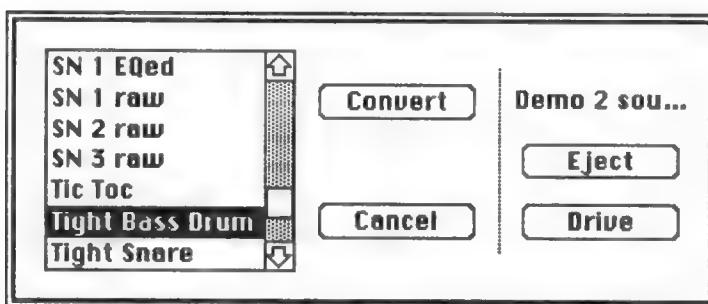
### Catalog ...

Catalogs the Sound File names on the current disk, as well as the wavesample names within the individual sound files.



### Convert ...

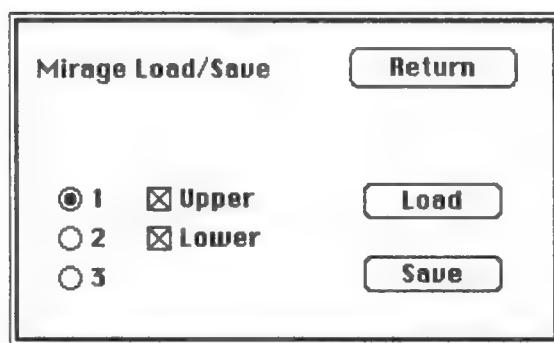
Converts any disk file (e.g., an algorithmic wavedata file, eight-bit waveform data from other samplers, even a Mac Paint file!) to Sound Lab wavedata type. After you select the Convert command, a dialog box appears presenting a list of files previously stored on the disk named in the dialog box. You can convert a file by first clicking on the desired file name and then on the Convert button (or by double clicking over the file name).



This data may then be loaded into Sound Lab using the Wavedata file option in the Open command. Often zeros data values will be present in newly converted files (especially from non-sampled material) and will halt the playback of your Wavesample. You can use the Sound Lab Filter Zeros command to strip unwanted zeros from your sample. See the Filter Zeros command from the MASOS menu.

#### **Mirage Disk ...**

Loads and Saves sounds from the Mirage's memory to its internal disk drive via remote Macintosh control.



#### **Import ...**

Translates any sound stored in Sound Designer file format to Sound Lab format and pastes it into the currently selected wavesample. After choosing the Import command, a dialog box appears with a list of sounds available for importing. To import a sound, click over the desired sound followed by Import, or double-click over the sound name.

If the size of the sound to be imported exceeds the limits of the memory allocated to the current wavesample, the sound may be truncated or more wavesample memory can be allocated using the Sound Lab memory allocator bar.

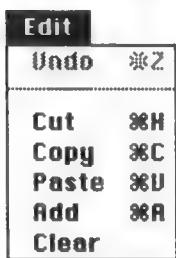
#### **Export ...**

Translates the current wavesample selected in the overview window from Sound Lab to Sound Designer format. After choosing the Export command, a dialog box appears with the sound to export highlighted in the name box. Clicking the Export button will save the wavesample in Sound Designer format on the disk named in the dialog box. Use the Eject and Drive buttons to save on alternate disks.

### Quit

Closes both the Upper and Lower Sound Files, as well as the MIDI driver, then returns you to the Finder. Before closing each Sound File, Sound Lab brings out a dialog box which asks you if you would like to save a copy to disk.

## The Edit Menu



The Edit Menu contains commands standard to most Macintosh applications such as Cut, Copy, and Paste. These commands will execute as expected on desk accessories and other edit text items. Also embedded within these commands are the MASOS functions which manipulate blocks of Waveform data. However, these special MASOS interpretations are only in effect while the Overview Window is the active Window. Refer to the Mirage Advanced Samplers Guide for more details on MASOS data manipulation functions.

### Undo

Undoes the effects of your most recent action. Undo is dimmed when the most recent action cannot be undone (Undo is not currently available in Version 1.0).

### Cut

Waveform: Removes the section of Waveform data selected between the two Sound Cursors in the Overview Window. Waveform data to the right of the data cut, and within the current wavesample, is left-shifted to occupy the empty space.

Text: Removes a selection from an edit text item or a desk accessory and places it on the Clipboard for later Pasting.

Be aware of the difference between performing a Cut on Waveform and Text data. After Cutting Text data, a copy of the text is stored on the Clipboard for later pasting. Sound Lab does not have a Waveform data equivalent to the Clipboard. Instead, when Waveform data is Cut, it is gone forever!

### **Copy**

Waveform: Marks the section of Waveform data selected between the two Sound Cursors in the Overview Window for later Pasting.

Text: Copies a selection from an edit text item or a desk accessory and places it on the Clipboard for later Pasting.

### **Paste**

Waveform: Stamps the previously marked (copied) Waveform data over the region selected by the Sound Cursors. Waveform data which stretches beyond the selected paste region is truncated.

Text: Pastes a selection from the Clipboard to an edit text item or a desk accessory.

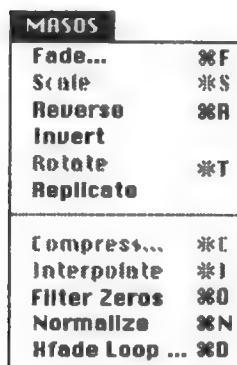
### **Add**

Adds the previously marked (copied) Waveform data to the data selected between the Sound Cursors. Waveform data which stretches beyond the selected add region is truncated.

### **Clear**

Removes the section of Waveform data selected between the two Sound Cursors in the Overview Window (thus erasing that span of memory).

## **The MASOS Menu**



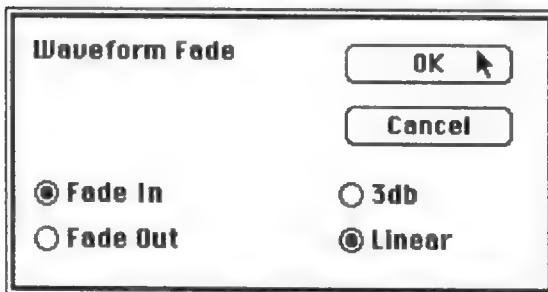
MASOS (The Mirage Advanced Samplers Operating System) is the cornerstone of digital audio processing in the Mirage. Sound Lab's internal MASOS emulation allows many editing and processing features contained in Sound Lab to be rapidly executed on both the Macintosh and the Mirage.

The Compress and Interpolate functions, however, are unique to Sound Lab and require additional time to transfer Waveform data across to the Mirage. The "Waveform Data Transfer In Progress" dialog will appear, allowing you to monitor the transfer process.

Most of Sound Lab's MASOS functions require the use of the Sound Cursors and/or the Scale Line controller. See "Using the Sound Cursors" and "Using the Scale Line Controller" in Part I of this manual for operational instructions.

### **Fade**

The Fade command options allow you to designate the direction and type of fade you desire. It shows a dialog box listing the two sets of options.



- The Fade In and Fade Out buttons designate the direction of the fade.
- The Linear and 3 dB buttons designate the slope of the fade. The 3 dB Fade option is a custom feature of Sound Lab and is ideally suited for preparing sounds, which when later combined, create smooth 3dB cross-fades.
- Clicking inside the OK button performs the desired Fade on the Waveform data currently selected in the Overview Window.

**Scale**

Scales the Waveform data currently selected in the Overview Window. Scale Factors Start and End must first be set using the Scale Line Controller before the Scale command can be chosen. See the section on "The Overview Window" for details on the Scale Line controller.

**Reverse**

Reverses the Waveform data currently selected in the Overview Window.

**Invert**

Inverts the Waveform data currently selected in the Overview Window.

**Rotate**

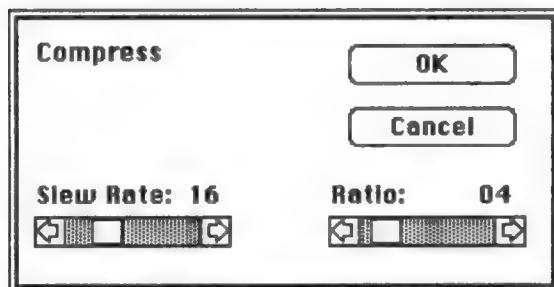
Rotates the entire Wavesample's waveform data by the degree and direction indicated in the Page window. See Page window in the Waveform menu for information on how to set up a rotation.

**Replicate**

Copies the first selected page of Waveform data to each page between the two Sound Cursors.

**Compress**

Compresses the Waveform data selected in the Overview Window. Only the section of the Waveform above the Compression Threshold (as set by the "Scale Lines") is compressed. After selecting the Compress command, a dialog box appears showing the current settings for slew rate and compression ratio.



- The Slew Rate determines the rate at which the compressor takes affect at the threshold level. Low settings (0 to 5) results in a hard compression while higher settings create a softer compression (i.e., smoother transition at the threshold level).
- Compression Ratio sets the amount of compression. The waveform data above the threshold is scaled down by the amount set by Ratio. Low values (2 - 4) result in a light compression, while higher values (10 or more) result in a heavier compression similar to limiting.

### **Interpolate**

Interpolates a new Wavesample based on the interpolation ratio indicated in the Page window. For information on interpolation see "Interpolate mode" under Page window in the Waveform menu.

### **Filter Zeros**

Filters unwanted zeros (sample value of 00 Hex) from the waveform data you have selected, defined by the two sound cursors in the Overview window.

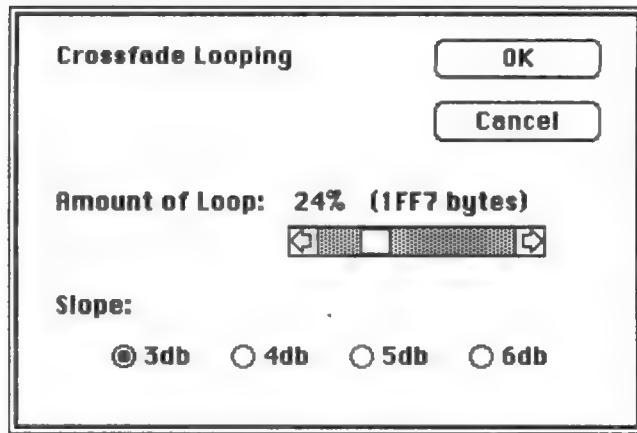
Since the Mirage uses zero values to mark the end of Wavesamples, you can use the Filter Zeros command after Converting sound data from another source to Sound Lab Wavedata type, and so prevent unexpected termination of Wavesample playback.

### **Normalize**

Automatically adjusts the amplitude of the selected sound data to its maximum level without clipping distortion.

### **Xfade Loop ...**

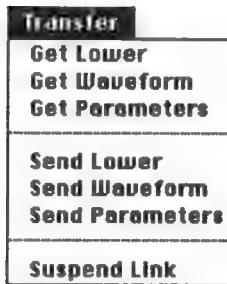
Cross-fades a proportional amount of sound data before the loop start marker with the same amount of sound data before the current sample's loop end marker.



After choosing Xfade Loop a dialog box appears presenting the cross-fade looping options. The "Amount of Loop" option indicates the number of bytes before the loop start marker to be cross-faded with the equivalent number of samples before loop end. The amount of loop area affected by the cross-fade is displayed as a percentage. Most good cross-fade loops lie within the 25 to 50 percent range.

The four buttons across the bottom of the cross-fade dialog represent the various slope options available ranging from the most common slope of 3 dB down to the nearly linear 6 dB down.

## The Transfer Menu



### **Get Upper / Get Lower**

Transfers all the waveform and parameter data from the Mirage to the Macintosh. This command only transfers data from the current keyboard half.

### **Get Waveform**

Transfers waveform data from the Mirage to the Macintosh. This command only transfers the data currently selected by the Sound Cursors.

### **Get Parameters**

Transfers program, wavesample, and configuration parameter data from the Mirage to the Macintosh. This command only transfers data from the current keyboard half.

### **Send Upper / Send Lower**

Transfers all the waveform and parameter data from the Macintosh to the Mirage. This command only transfers data from the current keyboard half.

### **Send Waveform**

Transfers waveform data from the Macintosh to the Mirage. This command only transfers the data currently selected by the Sound Cursors.

### **Send Parameters**

Transfers program, wavesample, and configuration parameter data from the Macintosh to the Mirage. This command only transfers data from the current keyboard half.

### **Suspend Link / Resume Link**

The Suspend Link Command stops the automatic transfer of parameters and waveform data between the Mirage and Macintosh. This is useful when you want to work on one machine without affecting the other. For example, you may wish to try out different compression ratios on a sample without having to wait for the waveform data to be transferred to the Mirage each time. After you have obtained the desired compression effect, you then choose Resume Link to try out your new sound on the Mirage.

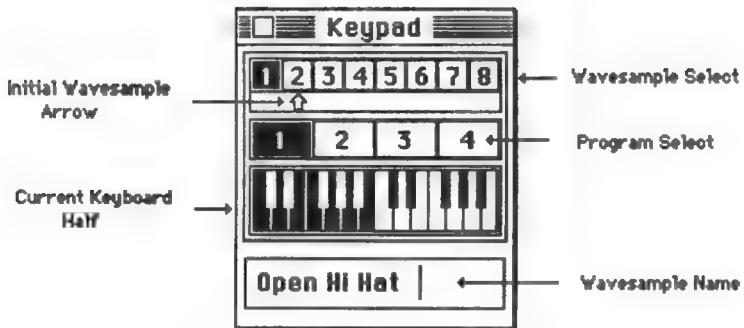
Resume Link restores the communication between the two machines. A dialog box appears displaying the which machine will be updated after re-establishing the communication link. This procedure insures the Macintosh and the Mirage will be synchronized properly.

Show / Hide Keypad

### **The Parameter Menu**



Choosing Show Keypad from the Parameter Menu opens the Keypad Window. The Keypad Window is central to the Macintosh-Mirage connection. From this window you can select Current Wavesample and Initial Wavesample (parameters [26] and [27]), your Program Presets 1 through 4, and your Current Keyboard Half (Upper/Lower). You can also assign names to each of your wavesamples for easy reference.



The window comes up with the wavesample and program selector controllers initially set to 1, and the keyboard half set to Lower. The initial wavesample arrow is set to the value stored in program 1, and the current wavesample name is "Wavesample One" by default.

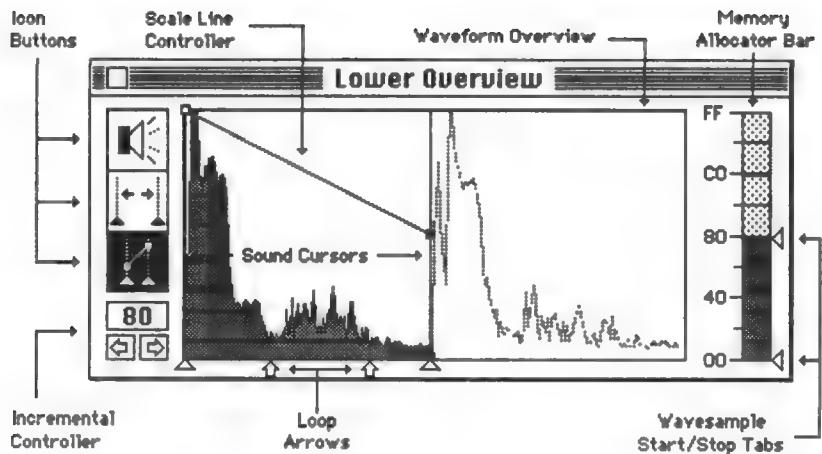
To change a selector parameter, simply point to the new value desired and click inside its rectangle. After choosing a new parameter the watch icon will come up briefly, asking you to wait while Sound Lab updates the Mirage and the Macintosh screen.

To change the initial wavesample, click inside the arrow and drag it underneath the desired wavesample value.

The wavesample name box is a standard Macintosh edit text box and follows the editing conventions outlined in the Macintosh owners manual.

### Show / Hide Overview

Choosing Show Overview from the Parameter menu opens the Overview Window. The Overview Window is central to Sound Lab's digital waveform editing and processing commands. The displays and controls in the Overview Window break down into two groups; those which allow you to monitor and select sections of the Mirage's waveform memory, and those which allocate that memory to a specific wavesample.



- The Waveform Overview Display is responsible for displaying all sound data contained in the current Mirage keyboard half (Upper or Lower). The dimensions of the display are 256 by 127, corresponding to the 256 pages of the Mirage with each page having an amplitude range of 0 to 127. The sound data is displayed as a peak amplitude envelope contour. The envelope of the currently selected wavesample is highlighted in gray, while the others are shown as a dimmed outline.

Along the bottom of the Overview display are the Sound Cursor tabs and Loop arrows.

The Sound Cursor markers within the Waveform Overview Display are two thin black vertical lines stretching from the top of the display to the triangular Sound Cursor tabs located just below the display frame. The Sound Cursors default to the Wavesample Start and Wavesample End memory locations (parameters [60] and [61]) of the currently selected wavesample.

The Loop Arrow Markers, present only while the Loop Switch is ON, are responsible for displaying and modifying Loop Start and Loop End (parameters [62] and [63]) for the current wavesample. The Loop Arrow markers can be adjusted by dragging the arrow to the desired location in memory, or by using the Incremental Controller when the Loop Arrow marker is selected.

Neither the Loop arrows nor the Sound Cursors can be dragged outside the memory allocated to the current wavesample. This is to safeguard you from accidentally changing the waveform of any sample other than the one which is currently selected. However, you may use the Memory Allocator Bar (see below) to expand the range of memory allocated to the current wavesample.

Clicking inside a region shared by more than one tab or arrow will always select the marker which begins that selection (Wavesample Start tab or Loop Start arrow). If you want to select an ending marker, you must hold down the command key while clicking the mouse. If things get too confusing, you can temporarily remove either the Sound Cursor tabs or Loop arrows with command switches in the Options menu.

As an alternative to using the wavesample select buttons in the Keypad window, clicking anywhere inside the Overview waveform display will select (and make active) the Wavesample allocated to that section of memory. If an area of memory is assigned to more than one Wavesample, continued clicking in that area cycles through each of the assigned Wavesamples.

- The Icon Switches are located along the top left side of the Overview window. Clicking inside the Speaker icon will play the range of memory between the two Sound Cursors through the Macintosh's internal speaker (or its Audio Out jack). This instant audio feedback can be used to quickly locate the exact range of memory you wish to edit or process. Sound Lab will always play back samples at 22K samples per second. As a result, the pitch heard through the Macintosh may differ from sampled pitch depending upon the sample rate used. If it was sampled at 22K, there will be no audible pitch shift.

Clicking ON the Open Cursors icon will set the Sound Cursor Start and End markers to the current Wavesample Start and End locations. Clicking the icon OFF, will return the Sound Cursors to their previous location. Sound Lab has the ability to remember a unique pair of Sound Cursor settings for each wavesample so you can move from wavesample to wavesample (upper or lower) without losing your previously selected edit points.

Clicking ON the Scale Line icon brings out the Scale Line controller and activates the Scale and Compress commands in the MASOS menu. The Scale Line controller is used to set the Scale Factor Start and Scale Factor End values necessary to perform the MASOS Scale command (refer to Advanced Samplers Guide pages 26-28). Its value ranges from 0 to FF (Hex.).

The Scale Line controller is also used to set a linear threshold level for the Compress command. The Compressor has no effect until the waveform reaches this threshold. Even used with the Compression function the Scale Line does not function as an automatic gain controller (copying and adding a sample to itself will achieve this effect).

The values expressed by the Scale Line controller can be modified by dragging the rectangular tabs located at both ends of the line or by using the Incremental controller (see below). The two Scale tabs can also be moved as a unit by dragging the Scale Line itself.

- The Memory Allocator Bar is responsible for displaying and modifying the Wavesample Start and Wavesample End (parameters [60] and [61] ) values for all eight wavesamples. The values for the current wavesample can be adjusted by dragging the corresponding triangular tab to the desired location in memory or by using the Incremental controller (see below). The controller displays the allocation status of the memory for the current Mirage bank (64K). The gray region represents the range of memory allocated to the current wavesample, the dotted region shows the memory allocated to the other wavesamples, and the white region represents unallocated memory.

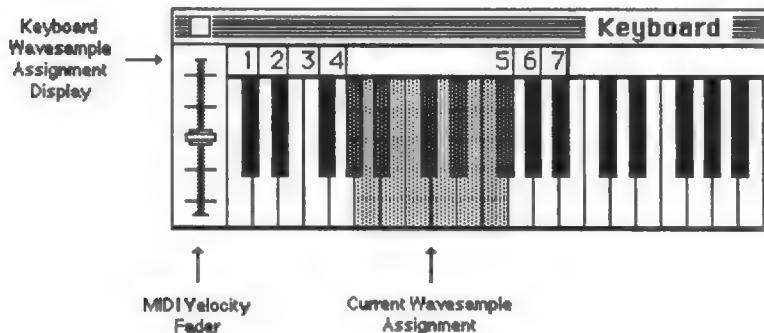
The vertical resolution of the Memory Allocator Bar is 128 pixels. As a result, each vertical point represents two pages of memory. When the start and end markers fall on the same point, the first page at this location becomes Wavesample Start and the last becomes Wavesample End. Whenever the Wavesample End is changed, 16 zeros are inserted at the end of the new page. This is how the mirage knows where the end of the wavesample is.

Clicking inside the Bar will select the wavesample allocated to that section of memory. If an area of memory is assigned to more than one wavesample, continued clicking in that area cycles through each of the assigned wavesamples.

- The Incremental Controller always displays the value (in hexadecimal) of the currently selected (shown as inverted) control tab or marker. The left and right arrows below the hex display can be used to increment or decrement the currently selected control tab. Holding the mouse down within an arrow will increment (or decrement) that value repeatedly.

### Show / Hide Keyboard

Choosing Show Keyboard from the Parameter Menu opens the Keyboard Assignment Window.



The Keyboard window displays and modifies the Wavesample keyboard assignment for all sixteen possible Mirage Wavesamples. In addition, the Keyboard window can be used as a remote MIDI trigger source for the Mirage Digital Sampling Keyboard or rack-mount Digital Multi-Sampler.

You can edit the keyboard assignment of a Wavesample by placing the cursor over any of the dividing vertical lines in the Wavesample Assignment Display area. The cursor will change from the standard pointer to a bi-directional arrow which you can drag left or right to resize the Wavesample's keyboard assignment. Each time you release the mouse button, Sound Lab will calculate the new zones for the wavesample indicated and display them in the Wavesample Assignment Display.

The shaded keys in the Keyboard window (if there are any) represent the keys assigned only to the current wavesample. A current Wavesample's keyboard assignment that is masked by those of higher priority will appear dimmed in the Keyboard assignment Display, but may still be edited as previously explained.

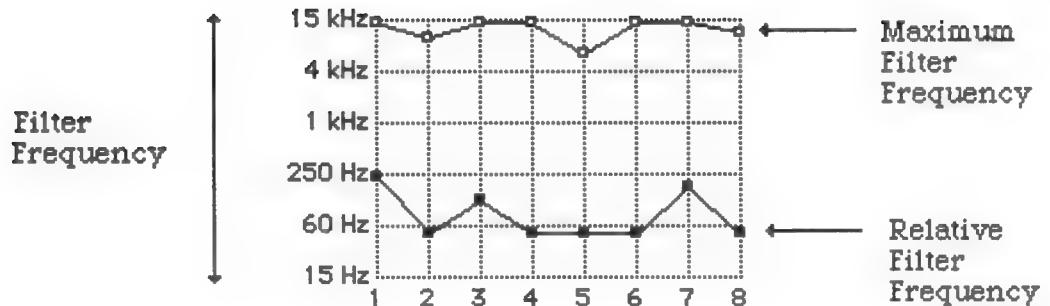
The Keyboard window takes into account the current settings of Initial Wavesample (parameter [72]) and Mix Mode (parameter [28]) when displaying the keyboard Wavesample assignment. Refer to the Advanced Samplers Guide (pgs. 12-16) for more information regarding keyboard Wavesample assignment.

You can remote-play the Mirage by clicking inside any of the keys in the Keyboard window, highlighting the key and generating a corresponding MIDI note on event. The Macintosh typewriter keyboard can also be used as a remote source of MIDI note on events. See "Remote Operation of the Mirage Digital-Multisampler" for more information.

### **Show / Hide Relatives**

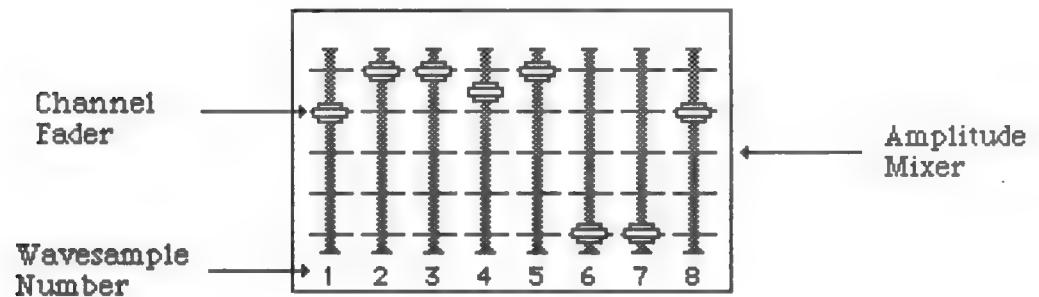
Choosing Show Relatives from the Parameter Menu opens the Relative Parameter Window. The Relative Parameter Window contains two main controllers, the Relative Filter Control and the Relative Amplitude Mixer.

- The Relative Filter Controller is responsible for displaying and modifying the Relative Filter and Maximum Filter Frequencies (parameters [70] and [71]) of all eight wavesamples in the current keyboard half. The white tabs across the top represent the individual Maximum Filter Frequencies and the black ones along the bottom are the Relative Filter Frequency offsets.



The Relative Frequencies of each wavesample (numbered one through eight along the bottom of the control) can be adjusted by dragging the corresponding rectangular tab to the desired vertical location on the grid. The frequencies along the far left column provide a visual reference for the Mirage's filter frequency response.

- The Relative Amplitude Mixer is responsible for displaying and modifying the Relative Amplitudes (parameter [69]) of all eight wavesamples in the current keyboard half.

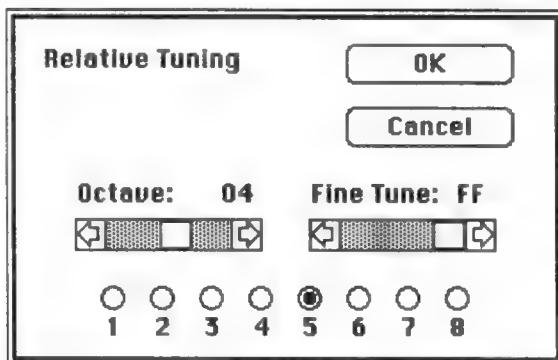


The Relative Amplitudes of each wavesample (also numbered one through eight along the bottom of the control) can be adjusted by dragging the channel fader to the desired level.

Be aware that as with all Sound Lab Program Controls, no updating of parameters takes place on the Mirage until the mouse button is released.

### **Relative Tuning ...**

Choosing Tuning from the Parameter Menu opens a dialog box containing Octave and Fine Tune scroll bar controls for the selected Wavesample.



- The Octave Control (relative tuning-coarse parameter [67]) has a range of eight octaves (0-7). The scroll bar is used to adjust the octave offset for the current wavesample.
- The Fine Tune Control (relative tuning-fine parameter [68]) has a range of 256 equal divisions of an octave (00-FF Hex). Clicking inside the gray region of the fine tune scroll bar offsets the current wavesample frequency one semitone.
- The Wavesample Select buttons allow you to select a Wavesample other than the current Wavesample so you can edit relative tuning parameters.

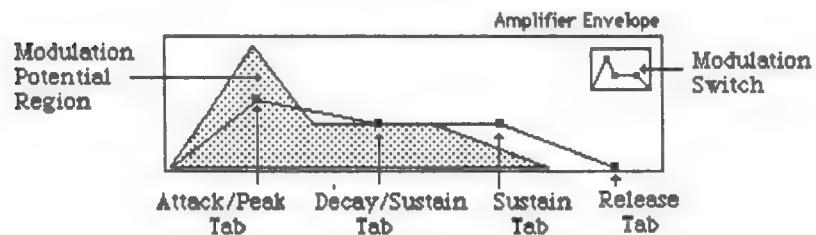
NOTE: Owners of the rack-mount Mirage Digital-Multisampler may generate MIDI note on events using the Macintosh typewriter keyboard to monitor the effects of relative tuning without exiting the dialog. Refer to the section on Remote Operation of the Mirage Digital Multi-Sampler for more information.

## Show / Hide Program Window

Choosing Show Program from the Parameter Menu opens the Program Control Panel. The Program Control Panel contains several customized controls which allow you see and interact with all thirty Mirage Program Parameters. The Program Control Panel breaks down into three groups: the Envelope Controllers, the Digital Oscillator Controllers, and the Filter Controller.

**NOTE:** Making an adjustment to a program control results in a delay of approximately one second before the Mirage is updated. This is due to the MIDI system exclusive data transfers between the Macintosh and Mirage. Do not play the Mirage during this brief data transfer or the parameter information you are sending may not be received by the Mirage.

- The Envelope Controllers (amplifier and filter) are responsible for displaying and modifying all Envelope and Envelope Modulation parameters (Mirage parameters [40] - [59]).



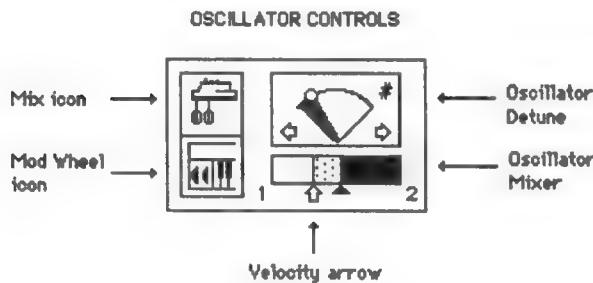
Envelope parameters Attack, Peak, Decay, Sustain and Release can all be edited by clicking and dragging their corresponding black rectangular tabs to create the desired envelope shape.

Clicking inside the Modulation Switch (the small envelope icon in the top right corner of each controller) highlights the switch and moves the control tabs over to the shaded Modulation Envelope. The Modulation Envelope represents the potential range of the envelope's response to Velocity and Keyboard Scaling modulation. Low modulation (hitting the keys softly) will create the envelope outlined by the solid black lines whereas maximum modulation will produce the envelope defined by the shaded region. Other levels of modulation will produce an envelope somewhere in between these two.

Sound Lab will not allow you to drag the Modulation Envelope to reflect values which are not logically possible. For example, you could not pull the Sustain of the Modulation Envelope below the sustain of the initial Envelope. The "Parameters" section of the Mirage Musicians Manual contains details on the effects of envelope modulation.

NOTE: On the Mirage, modulation parameter values greater than 16 have no effect. Therefore, in order for the Modulation Envelope to graphically represent these values, Sound Lab multiplies them by 2. This means that you will see a modulation setting of 30 on the Macintosh, while the Mirage displays a 15 for that same value.

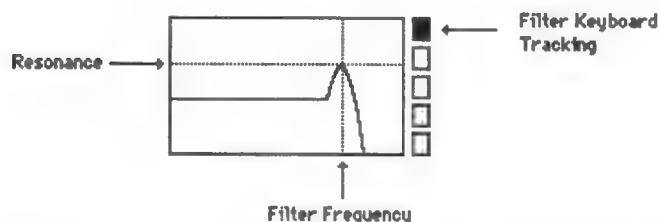
- The Digital Oscillator Controllers are responsible for displaying and modifying the Digital Oscillator parameters. There is an icon switch for Mix Mode (parameter [28]), an Oscillator Detune meter (parameter [33]), and a mixer for Oscillator Mix and Mix Velocity Sensitivity (parameters [34] and [35]). There is also an icon which chooses between the mod wheel and keyboard velocity as the source for Oscillator Mix modulation.



The Oscillator Mix control is adjusted by dragging the triangular black tab to the left or right. The white area inside the control represents the amount of oscillator one, and the black area oscillator two. The shaded region represents the velocity modulation potential of oscillator two. This means that when the keyboard is struck with a high velocity, oscillator two's region will expand to fill the shaded region. This velocity region is adjusted by dragging the white arrow which hangs below and behind the triangular mix tab. When the mod-wheel icon is selected, the shaded region disappears and the modulation wheel becomes the source of oscillator mix modulation. Clicking ON within the Mix icon puts the Mirage into Mix Mode. Refer to the Mirage Advanced Samplers Guide (pgs. 4 and 13) for details on Mix Mode.

The Oscillator 2 Detune controller is adjusted by either dragging the circle at the end of the meter's needle, or by clicking in the left or right increment arrows. The gray region to the left of the needle shows the amount of detune (sharpening of pitch) of oscillator 2. The Oscillator Detune controller is most sensitive at the beginning of the meter's range, where it is needed to obtain subtle control of phasing and chorusing.

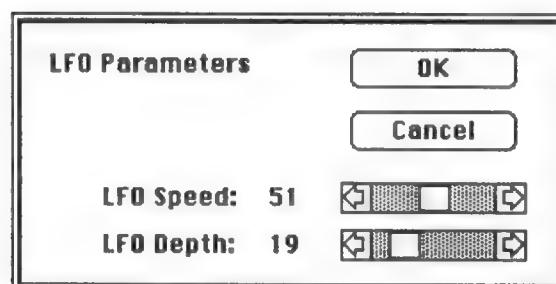
- The Filter Controller is responsible for displaying and modifying the Mirage's Filter Cutoff Frequency (parameter [36]), Filter Resonance (parameter [37]), and Filter Keyboard Tracking (parameter [38]).



Filter frequency and resonance are adjusted simultaneously by clicking and dragging at the point where the two dotted lines intersect. Clicking in one of the five vertical boxes to the right sets the Filter Keyboard Tracking (with the top most box representing the highest setting).

#### LFO ...

Choosing LFO from the Parameter Menu opens a dialog box containing the LFO Frequency (parameter [31]) and LFO Depth (parameter [32]) scroll bar controls.

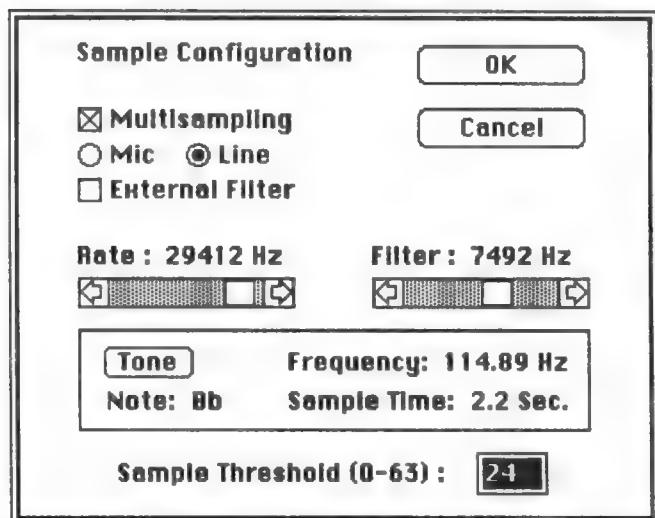


The LFO controls only effect the current program selected in the Keypad window. A Depth setting of zero gives the modulation wheel control of the LFO Depth.

### Sampling ...

Choosing Sampling from the Parameter Menu opens a dialog box listing the Sampling configuration options.

From The Sampling Parameters Dialog you can configure the Mirage's Sample Rate (parameter [73]), Sampling Threshold (parameter [76]), Input Filter Frequency (parameter [73]), and External Filter select (parameter [93]). You can also choose User Multisampling (parameter [77]) to be on or off, select Line or Mic level inputs (parameter [75]), and activate a special Macintosh Tuning Tone (see below).



Adjusting the Sample Rate scroll bar varies the Sample Rate, Input Filter Frequency, and Tuning Tone Frequencies all in Unison. This Sound Lab automation greatly reduces the amount of time necessary to acquire a good sample. When using the Internal Input Filter, the filter cutoff frequency tracks at an octave below Nyquist. However, when using the optional External Input Filter, the filter cutoff frequency tracks at Nyquist to accommodate for its increased frequency response. If you wish to adjust the Input Filter Frequency independently, a separate scroll bar is provided under its display.

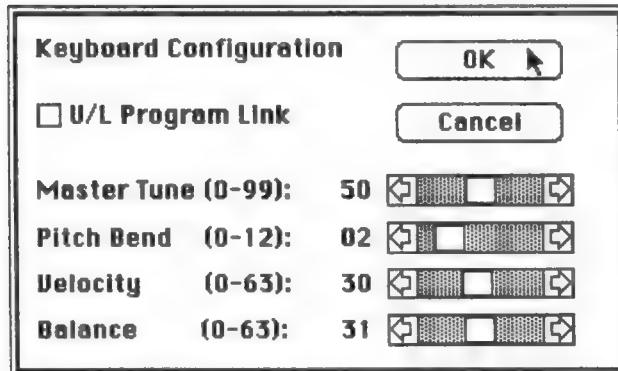
The Tone button toggles a Macintosh generated tuning tone on and off at a frequency optimized for easy single page looping (multiple of the Sample Rate divided by 256). The nearest equal tempered note equivalent is displayed to the right of the Tone button for your convenience.

The User Multisampling and External Filter check boxes can be toggled by clicking inside their adjacent rectangular boxes. Clicking the Mic or Line button allows you to select the audio input path.

NOTE: Unlike standard Macintosh protocol, modifying a parameter inside a Configuration Parameter Dialog causes an immediate result, rather than waiting until you exit the dialog with a Return or by clicking the OK button.

### **Keyboard ...**

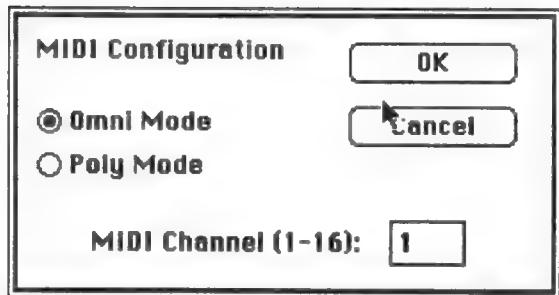
Choosing Keyboard from the Parameter Menu opens a dialog box listing the Keyboard configuration options. From The Keyboard configuration dialog you can set the Mirage's Master Tune, Pitch Bend Range, Keyboard Velocity Sensitivity, and Keyboard Balance (parameters [21] - [24]). You can also select the Upper/Lower Program Linking feature (parameter [25]).



Parameter values are modified individually by adjusting the scroll bar located to the right of each parameter. The Upper/Lower Program Link check box can be toggled by clicking inside the adjacent rectangular box.

### **MIDI ...**

Choosing MIDI from the Parameter Menu opens a dialog box listing the MIDI configuration options. From The MIDI configuration dialog you can configure the Mirage's MIDI transfer mode (parameter [81]), and MIDI Channel Select (parameter [82]).



While in Omni Mode, the Mirage will receive and transmit on all 16 MIDI channels. In Poly Mode, the Channel Selector allows you to designate the single MIDI Channel on which the Mirage will transmit and receive MIDI information.

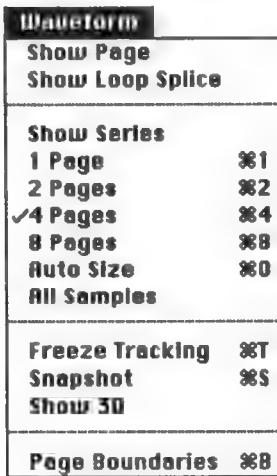
### Show / Hide Numerics

Choosing Show Numerics from the Parameter menu opens the Numeric Display.

Numeric Display								
Pointers	1	2	3	4	5	6	7	8
	Sample Start	00	20	40	60	80	A0	C0
Sample End	1F	3F	5F	7F	9F	BF	DF	FF
Loop Start	1E	3E	5E	7E	9E	BE	DE	FE
Loop End	1E	3E	5E	7E	9E	BE	DE	FE
Loop Fine	FF	FF	FF	FF	FF	FF	FF	FF
Loop Switch	00	00	00	00	00	00	00	00
Relatives								
Amplitude	1	2	3	4	5	6	7	8
Attack	00	00	00	00	00	00	00	00
Peak	10	10	10	10	10	10	10	10
Decay	15	15	15	15	15	15	15	15
Sustain	10	10	10	10	10	10	10	10
Release	10	10	10	10	10	10	10	10
Filter								
Attack	00	00	00	00	00	00	00	00
Peak	00	00	00	00	00	00	00	00
Decay	15	15	15	15	15	15	15	15
Sustain	00	00	00	00	00	00	00	00
Release	31	31	31	31	31	31	31	31
Osc / Filt								
Init Sample	0	0	0	0	0	0	0	0
Mix Mode	0	0	0	0	0	0	0	0
Mono Mode	0	0	0	0	0	0	0	0
LFO Freq	1	1	1	1	1	1	1	1
LFO Depth	0	0	0	0	0	0	0	0

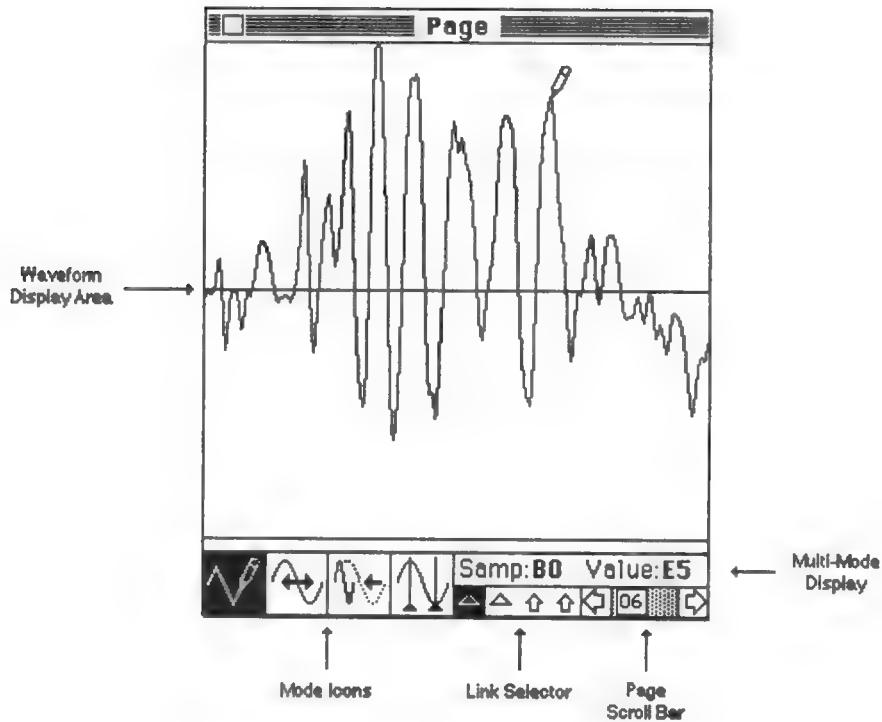
The Numeric Display window is responsible for displaying wavesample parameter values for all eight wavesamples and program parameter values for all four programs. The Numeric Display window is a read-only window for used for display purposes only

## The Waveform Menu



### Show / Hide Page

Choosing Show Page from the Waveform Menu opens the Page Window. From the Page Window display you can zoom into one page (256 samples) of the Mirage's waveform data.

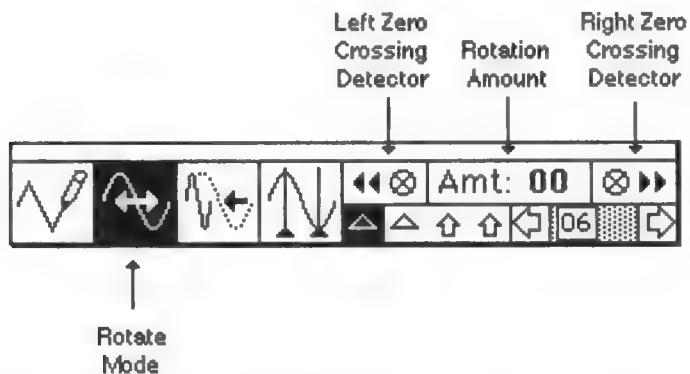


The four icon buttons along the bottom left of the Page Window correspond to the four possible modes of operation: Draw, Rotate, Interpolate, and MASOS fine-tune. The current mode is highlighted in inverse video. The page of memory represented in the waveform display area can be linked to any of the four markers in the Overview window (beginning/ending Sound Cursors or start/end Loop Arrows). The marker linked to memory is highlighted in inverse video in the Link Selector along the bottom center of the window. On the bottom right of the Page window is a scroll bar that steps you through memory one page at a time between the current Wavesamples' boundaries. The actual page number is displayed inside the thumb button as a hexadecimal number. Any changes in location are also displayed in the Overview Window. Above the scroll bar and Overview markers is the Multi-Mode Display.

Draw mode is activated by clicking inside the Draw icon. To modify an existing waveform or create an entirely new one, first position the pencil cursor at the point inside the waveform display where you wish to begin drawing, then drag the mouse to draw new waveform data directly into memory.

The Samp (sample number) and Value readouts in the Multi-mode Display give you a hexadecimal representation of the mouse position (left to right) inside the Page Window and the sample value (up and down) at that position.

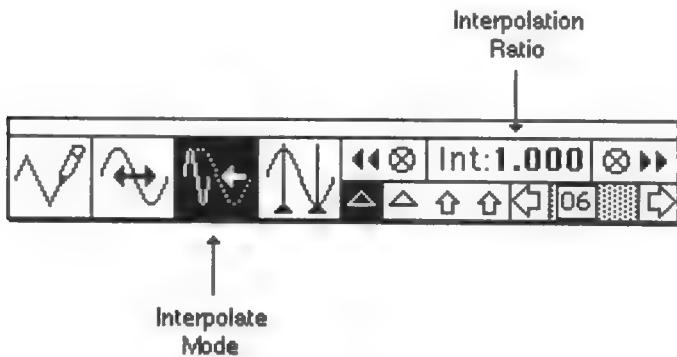
Rotate mode is activated by clicking inside the Rotate icon (second icon button to the left). To define the rotation amount using the hand cursor, first position the mouse somewhere inside the Page window's waveform display. At that point the arrow will change to a "hand" cursor indicating you can now drag the waveform to the left or right, up to a full page in either direction. As you drag the waveform, the rotation amount is shown in hexadecimal in the Multi-mode display.



The Zero-crossing detector buttons can be used to align the left page boundary with the next zero-crossing found in the waveform. Clicking inside the left zero-crossing button will tell Sound Lab to take the next zero-crossing (forward in memory), and to move it to the left so that it lies on the page boundary. Alternately, clicking inside the right zero-crossing button tells Sound Lab to look backward in memory for the next zero-crossing and to move it to the right so it lies on the page boundary. After releasing the mouse button Sound Lab will redraw the waveform to give you a graphic preview of the rotation. The rotation amount will now reflect the number of samples the graphic preview has been rotated. Aligning the left page boundary at a zero-crossing on your loop start page is invaluable for improving the quality of your loops.

To execute a rotation, choose the Rotate command from the MASOS menu. No rotation takes place until the Rotate command is chosen; failure to do so will cancel the rotation set-up when closing the Page window.

Interpolate mode is selected by clicking inside the Interpolate icon (third from the left). Like the Rotate mode, the interpolation amount (ratio) can be defined using the hand cursor or the Zero-crossing detector buttons (see Rotate mode above).



The visual effect of interpolating a waveform is much like squeezing or stretching a spring. Dragging the hand cursor to the left while it is within the waveform display area will squeeze more waveform data into the page. It is important to remember that, while in Interpolate mode, the left page boundary acts as a node or base from which the waveform is squeezed or stretched.

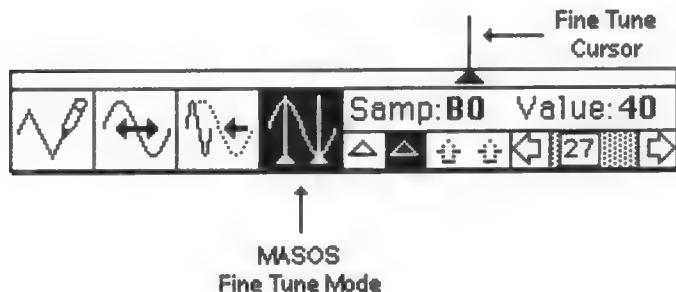
The audio effect of executing the interpolation would be like resampling the waveform data at a lower sample-rate (sample-rate conversion), and so decreasing the amount of memory used to define the wavesample.

Dragging the hand cursor to the right stretches the waveform, requiring more samples and more memory to define the same wavesample. However, since Sound Lab "interpolates" new samples between the pre-existing ones, you can achieve the effects of sample rates much higher than the sampling capability of the Mirage, actually increasing the fidelity of your sample.

The Zero-crossing detector buttons align page boundaries as in Rotate mode, but because the waveform in Interpolate mode is always expanded or contracted, the next zero-crossing of the waveform is aligned with the right page boundary. This can be of great value when trying to fit one cycle of a sample exactly within page boundaries for single page loops.

To execute the interpolation, choose the Interpolate command from the MASOS menu. No interpolation will take place on the wavedata until the Interpolate command is chosen; failure to do so will cancel the interpolation set-up when closing the Page window.

MASOS fine-tune mode is selected by clicking inside the MASOS fine-tune icon (first on the right). The MASOS fine-tune mode is used to extend the precision of the Sound Cursors in the Overview window to the resolution of an individual sample. After you select the MASOS fine-tune mode, the fine tune cursor appears in the area just above the mode icons. You can manipulate the fine-tune cursor(s) in the same manner as the Sound Cursors in the Overview window (see "Using the Sound Cursors" in the Sound Lab manual). The "Samp" and "Value" readouts in the Multi-mode display show the current sample number and sample value of the fine-tune cursor in hexadecimal.

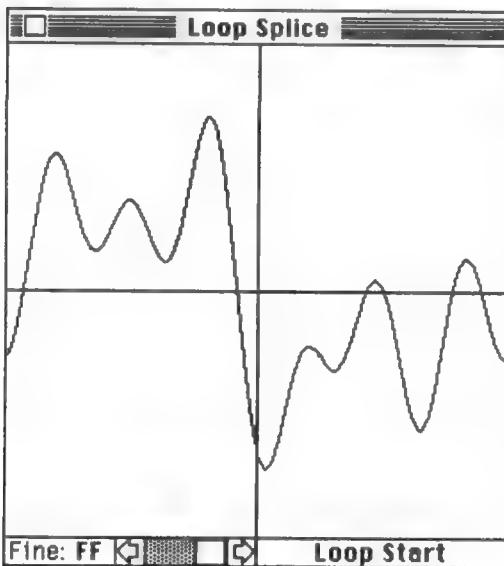


The fine-tune cursor(s) present in the Page window is always an extension of the Sound Cursor currently linked in the Overview window. Both fine-tune cursors may be present at the same time if the Sound Cursors in the Overview window are on the same page.

The Link Selector allows you to link the Page window with any single Sound Cursor or Loop arrow in the Overview window. Clicking inside any of the markers within the selector will highlight corresponding cursors in both the Page and Overview windows, indicating they are now current. The Page window's waveform display area will be redrawn to reflect the newly selected page in memory. This can be helpful if, for example, you wish to quickly compare the loop start page with the loop end page.

### Show /Hide Loop Splice

Choosing Show Loop Splice from the Waveform Menu opens the Loop Splice Window. The Loop Splice Window is responsible for displaying and modifying the Loop Splice Point (Loop End Fine Adjust [64]) of the currently selected wavesample. This display is useful when you are trying to get a smooth waveform transition necessary for quiet looping.

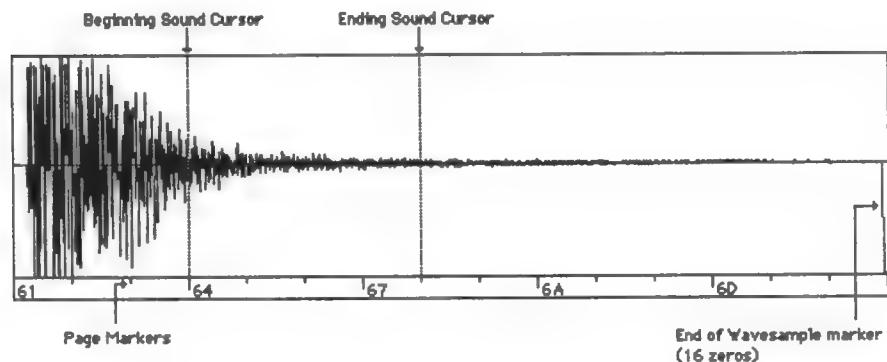


The Left Side of the display shows the last 128 samples before the Loop End Fine Adjust point. The Right Side displays the first 128 samples of waveform data after Loop Start. The line in the center reflects the transition of the loop between these two points.

The Loop End Fine Adjust is modified by clicking inside the scroll bar at the bottom of the window. Holding the mouse button down in either scroll bar arrow shifts the left half of the waveform display to reflect the changes. This parameter should only be adjusted, to a value other than FF, for loops that are eight pages or longer. See "Lengths of Short Loops" in Advanced Sampler's Guide (page 58) for more information.

### Show / Hide Series

The Show Series Command opens the Waveform Series display.



Show All and Skip Sample affects the way in which waveform data is compressed to fit within the Series Window. Simply stated, Skip Samples will only take one sample every few samples (however many it takes to fill the display). For example, if you wanted to show a 1K section of memory across the 512 pixel Waveform Series display, Skip Samples would only show every other sample and skip the others. Show All, on the other hand, takes all the samples and squeezes them into the display giving you a higher density readout of the waveform. Skip Samples is the default setting, good for most display situations because of its speed.

The Show All command is useful for displaying high frequency samples, long segments of wavesample memory, or when looking for glitches and pops which the Skip Mode might miss.

#### **Unfreeze / Freeze Tracking**

The Unfreeze Tracking command tells the Waveform Series Display to follow the location of the first Sound Cursor (in the Overview window) and begin displaying the waveform data from that point in memory. The command also toggles the menu item to now read "Freeze Tracking".

The Freeze Tracking command Freezes tracking of the Waveform Series Display to the current location of the Sound Cursors in the Overview window and toggles the menu item to read "Unfreeze Tracking". This will lock the display to a desired segment of memory. Further movement of the Sound Cursors will not affect the Waveform Series Display until Unfreeze Tracking is selected.

**NOTE:** The Tracking function is a powerful Sound Lab display feature, but should be used sparingly because of the time necessary to redraw the Waveform Series display. This is especially true when tracking is used in combination with Auto Size or Show Samples.

#### **Snapshot**

The Snapshot Command takes a "picture" of the waveform which lies between the Sound Cursors and blows it up to fill the Series display. It freezes tracking, auto sizes, and sets the Show All option.

#### **Show 3-D**

Choosing Show 3-D from the Waveform menu opens the 3-D window and displays the waveform data selected (using the two Sound Cursors in the Overview window) as a three-dimensional waveform plot.

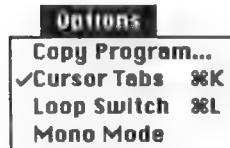
You can change the number of pages represented in each horizontal plane by choosing a different waveform series display attribute (1 page, 2 pages, 4 pages, and 8 pages) before choosing Show 3-D.

To interrupt plotting hold down the "clover" key (control key) and type the "." (period) key. You can exit the 3-D display by clicking inside the window's go-away box.

### **Page Boundaries**

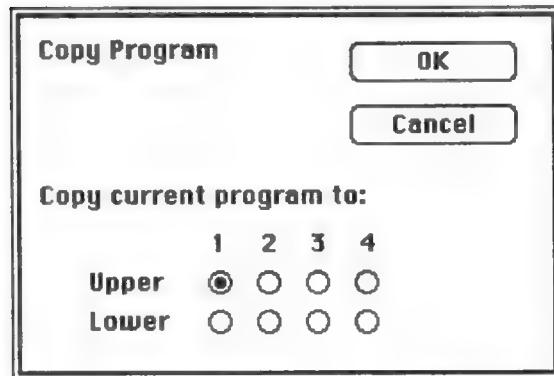
Displays dotted lines where page boundaries fall in memory. When the boundary lines are present, Sound Cursor images appear as solid black lines as opposed to the usual gray.

## **The Options Menu**



### **Copy Program**

Copies the current Program into desired destination Program slot.



### **Cursor Tabs**

The Cursor Tabs command removes the triangular tabs from the base of the Sound Cursors. This is useful when both the Sound Cursors and Loop Arrows are occupying the same space and you want to temporarily remove the cursor tabs in order to adjust the loop arrows.

**Loop Switch**

Switches the Mirage's Loop function (parameter [65]) for the current wavesample on and off. Toggling the Loop Switch also displays and hides the Loop Arrow Markers in the Overview window.

**Mono Mode**

Toggles the Mirage's Mono Mode (parameter [29]) for the current program on and off. A checkmark is displayed in the menu if the current mode is on.

## Appendix

### Remote-play of the Mirage Digital Multi-Sampler

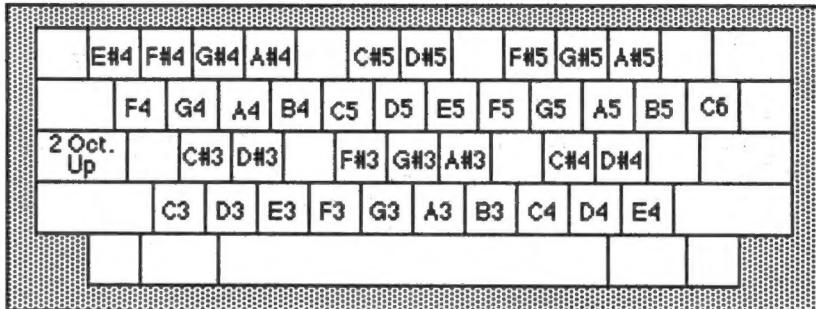
Three different methods have been provided for the remote-play of your Mirage Digital Multi-Sampler: mouse control via the on-screen Keyboard window; key control from the Macintosh typewriter keyboard or control from a master MIDI keyboard controller. These methods may be used alone or in combination, depending on your personal configuration.

To use a master MIDI keyboard controller, you will need either a dual-channel MIDI interface (i.e., Southworth™ interface), or two separate MIDI interfaces (running at the same clock speed) connected to each port on the Macintosh (modem, printer). When using this configuration, Sound Lab MIDI merging routines take care of potential MIDI traffic jams during system exclusive data transfers (wavedata dumps).

**NOTE:** For proper operation, you must connect the master keyboard to the Printer port's MIDI interface (Southworth channel two), and the Mirage to the normal modem port device (Southworth channel one).

The Macintosh typewriter keyboard can be used as a remote source of MIDI note on events. The keyboard is capable of either single note or two note polyphony. The notes currently triggered from the Macintosh highlight the corresponding keys in the Keyboard window. The MIDI note on velocity is controlled by the Velocity Slider on the left most side of the Keyboard window. This remote-play option is important for owners of the rack-mount Mirage who wish to use the real time scrolling capability of the Loop-splice window while sustaining a note .

The keyboard layout is diagrammed as follows:



The Keyboard window can also be used to remote-play the Mirage. See "The Keyboard Window" in the Parameter menu section of the Reference Manual Update.

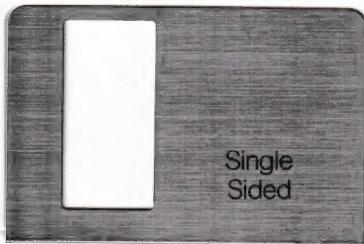
## Handling Raw Waveform Data

Wavedata selected by the two Sound Cursors in the Overview window can now be saved and loaded independent of associated parameter values. This in itself should suggest numerous possibilities. For example, disk based wavedata buffers, off-line algorithmic waveform generation, sound data compatibility, wavedata libraries, and so on. The Convert and Filter Zero functions have been added to Sound Lab to aid you in handling raw waveform data. For more information, see the sections on "The Convert Command" and "The Filter Zeros Command" under the File and MASOS menus in the reference section of this update.

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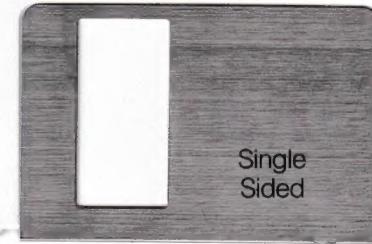
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